Sedimentary Rock-Forming Minerals and Materials

- Calcite
- Kaolinite
- Montmorillonite
- Siderite
- Gypsum
- Sylvite
Minerals of Sedimentary Rocks

• Formed by chemical weathering of minerals that are unstable under surface conditions – clay minerals, oxides (hematite, magnetite), hydroxides (goethite, brucite, gibbsite)

• Minerals that precipitate from solution – carbonates, evaporites (halite, sylvite, gypsum), Precambrian iron formation (BIF)

• Detrital minerals – survive physical and chemical weathering processes – e.g. quartz, garnet, rutile, ilmenite, magnetite
Goethite [FeO(OH)]

Limonite [FeO(OH)·nH₂O] - unidentified massive hydroxides and oxides of iron, with no visible crystals, and a yellow-brown streak.
Clay Minerals

The basic building blocks of the clay minerals are tetrahedral layers and octahedral layers \{\text{Brucite} [\text{Mg(OH)}_2] \text{ or Gibbsite} [\text{Al(OH)}_3]\}
1:1 layer clays (e.g. Kaolinite)
2:1 layer clays (e.g. Montmorillonite)
The general term for this group is smectites and they are expandable (swelling) clays
It is difficult to distinguish between clay minerals either in hand specimen or in thin section (there are 220 varieties). The method of choice is X-ray diffraction (XRD).
Carbonate minerals – $\text{CaCO}_3$ polymorphs - aragonite and calcite
Carbonate minerals and solid solution series
Evaporite Minerals – Halite and Sylvite

Halite: NaCl
and sylvite: KCl
F 4/m 3 2/m

Halite

Sylvite
Gypsum (monoclinic) and Anhydrite (orthorhombic)
Chert (SiO$_2$·xH$_2$O)

Phosphorite (fluorapatite)